

WHAT IS CLAIMED IS:

1. An antigenic conjugate comprising a carrier protein covalently bonded to the conserved portion of a lipopolysaccharide of a gram negative bacteria, wherein said conserved portion of the lipopolysaccharide comprises the inner core and lipid A portions of said lipopolysaccharide, said conjugate eliciting a cross reactive immune response against heterologous strains of said gram negative bacteria.
2. An antigenic conjugate as in claim 1, wherein said conjugate elicits a cross reactive immune response against heterologous genera of gram negative bacteria.
3. An antigenic conjugate as in claim 1, wherein said lipopolysaccharide is de-O-acetylated.
4. An antigenic conjugate as in claim 1, wherein said carrier protein is selected from the group consisting of tetanus toxin or toxoid, diphtheria toxin or toxoid, mutant of diphtheria toxin CRM₁₉₇, pseudomonas exotoxin A, cholera toxin or toxoid, Group A streptococcal toxins, pneumolysin of *Streptococcus pneumoniae*, filamentous haemagglutinin (FHA), FHA fragments of *Bordetella pertussis*; pili or pilins of *Neisseria gonorrhoeae*, pili or pilins of *Neisseria meningitidis*; outer membrane proteins of *Neisseria meningitidis*, outer membrane proteins of *Neisseria gonorrhoeae*; C5A peptidase of *Streptococcus* and surface protein of *Moraxella catarrhalis*.
5. An antigenic conjugate as in claim 1, wherein said carrier protein is linked to said conserved portion of the lipopolysaccharide with a compound selected from the group consisting of Sulfosuccinimidyl-6-(3-[2-pyridyldithio]propionamido)-hexanoate (Sulfo-LC-SPDP); succinimidyl-6-(3-[2-pyridyldithio]propionamido)-hexanoate (LC-SPDP); Traut's reagent (2-iminothiolane); N-succinimyl-S-acetyl thioacetate (SATA); N-Succinimidyl-3-(2-pyridyl dithio)propionate (SPDP), succinimidyl acetyl thiopropionate (SATP), succinimidyl-4-(N-maleimido methyl)cyclohexane-1-carboxylate (SMCC), maleimido benzoyl-N-hydroxy succinimide ester (MBS), N-succinimidyl (4-iodoacetyl)aminobenzoate (SIAB), succinimidyl 4-(p-maleimidophenyl)butyrate (SMPB), bromoacetic acid-N-hydroxy succinimide (BANS) ester, 1-ethyl-3-(3-dimethylamino propyl) carbodiimide (EDAC), adipic acid dihydrazide (ADH), cystamine and dithiobis(succinimidyl propionate) (DTSSP).

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6. An antigenic conjugate as in claim 1 wherein said gram negative bacteria is selected from the group consisting of *Neisseria meningitidis*, *Neisseria gonorrhoeae*, *Haemophilus influenzae*, non-typeable *Haemophilus influenzae*, *Haemophilus ducreyi*,
5 *Helicobacter pylori*, *Escherichia coli*, *Chlamydia*, *Salmonella*, *Salmonella typhimurium*, *Salmonella minnesota*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Moraxella catarrhalis*, *Bordetella pertussis*, *Shigella*, *Klebsiella*, and *Vibrio cholerae*.
7. An antigenic conjugate as in claim 6, wherein said gram negative bacterium is
10 *Neisseria meningitidis*.
8. An antigenic conjugate comprising the carrier protein diphtheria toxin CRM₁₉₇ covalently bonded to the conserved portion of a lipopolysaccharide of *Neisseria meningitidis* with long chain N-succinimidyl-3-(2-pyridyldithio)-propionate, and
15 bromoacetic acid-N-hydroxysuccinimide ester, wherein said conserved portion of the lipopolysaccharide comprises the inner core and lipid A portions of said lipopolysaccharide, said conjugate eliciting a cross reactive immune response against heterologous strains within the genus *Neisseria meningitidis*.
- 20 9. An antigenic conjugate as in claim 8, wherein said conjugate elicits a cross reactive immune response against heterologous genera of gram negative bacteria.
10. A vaccine formulation comprising an effective amount of the antigenic conjugate of claim 1.
- 25 11. A vaccine formulation comprising an effective amount of the antigenic conjugate of claim 2.
12. A vaccine formulation comprising an effective amount of the antigenic conjugate of claim 8.
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13. A vaccine formulation comprising an effective amount of the antigenic conjugate of claim 9.

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14. A method of immunizing an individual to prevent disease caused by a gram negative pathogen, comprising vaccinating the individual with a prophylactically effective amount of vaccine formulation comprising an antigenic conjugate comprising a carrier protein covalently bonded to the conserved portion of a lipopolysaccharide of a gram negative bacteria, wherein said conserved portion of the lipopolysaccharide comprises the inner core and lipid A portions of said lipopolysaccharide, said conjugate eliciting a cross reactive immune response against heterologous strains of said gram negative bacteria.
- 10 15. A method as in claim 14, wherein the vaccine formulation is administered to said individual by a route of administration selected from the group consisting of intradermal, intramuscular, intraperitoneal, intravenous, vaginal, subcutaneous, ocular, intranasal, and oral administration.
- 15 16. A method as in claim 14, wherein said vaccine formulation further comprises a physiological carrier and an adjuvant.
17. A method for preventing bacterial sepsis in a mammal in need thereof, comprising administering an effective amount of a formulation comprising an antigenic conjugate comprising a carrier protein covalently bonded to the conserved portion of a lipopolysaccharide of a gram negative bacteria, wherein said conserved portion of the lipopolysaccharide comprises the inner core and lipid A portions of said lipopolysaccharide, said conjugate eliciting a cross reactive immune response against heterologous strains of said gram negative bacterial organisms.
- 20 18. A method for preventing bacterial sepsis in a mammal in need thereof, comprising administering an effective amount of a formulation comprising an antigenic conjugate comprising a carrier protein covalently bonded to the conserved portion of a lipopolysaccharide of a gram negative bacteria, wherein said conserved portion of the lipopolysaccharide comprises the inner core and lipid A portions of said lipopolysaccharide, said conjugate eliciting a cross reactive immune response against heterologous genera of gram negative bacterial organisms.
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